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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,243	05/30/2001	Robert L. Brainard	50540	8839
21874	7590	12/28/2005	EXAMINER	
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			LEE, SIN J	
			ART UNIT	PAPER NUMBER
			1752	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/870,243

Applicant(s)

BRAINARD ET AL.

Examiner

Sin J. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,7-20,22 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,7-20,22 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 2-6 and 21 are canceled by applicants.
2. In view of the amendment of October 14, 2005, previous 102(e) rejection on claims 1, 7, 8, 11-15 and 19-21 over Jung et al '518 and 103(a) rejection on claims 9 and 10 over Jung et al'518 are hereby withdrawn.
3. In view of the amendment of October 14, 2005, previous 102(e) rejection on claims 1, 2, 7, 8 and 11-20 over Chen et al'447 and 103(a) rejection on claims 9 and 10 over Chen et al'447 are hereby withdrawn.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 7, 8, 11-17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al (US 6,303,263 B1).

Chen et al teaches a chemically amplified resist system that comprises a dual blocked polymer resin and a photoacid generator (see abstract). Specifically, in Example 7, Chen teaches a resist composition containing a dual blocked terpolymer comprising hydroxystyrene, t-butyloxycarbonyloxystyrene, and methoxycyclohexane protected hydroxystyrene (which is a *ketal* protected hydroxystyrene) and a photoacid

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generator (di(t-butylphenyl)iodonium *perfluorooctane sulfonate*). Chen also teaches (col.6, lines 39-40) that his photoacid generator can be present in the amount of 0.005 to 10 wt.%. Therefore, one skilled in the art would immediately envisage using 10 wt.% of the photoacid generator in Chen's composition because "10wt.%" is clearly disclosed as the higher end of the taught range. Also, Chen teaches (col.5, lines 41-47) that imaging of his resist can be done with mid-UV, deep UV, *extreme-UV*, e-beam, X-ray. Therefore, one skilled in the art would immediately envisage using extreme-UV as the light source because there are only several examples taught for the light source. Therefore, Chen teaches present inventions of claims 1, 7, 8, 11, 13-16 and 19.

With respect to present claim 12, Chen also teaches that nitrobenzyl compounds can be used as his photoacid generator (see col.5, lines 31-35). Therefore, Chen teaches present invention of claim 12.

With respect to present claim 17, Chen also discloses a terpolymer which is made by partially protecting phenols of hydroxystyrene-*t-butylacrylate* copolymer with methoxycyclohexanyl group (a ketal group) in his Example 5. Therefore, Chen teaches present invention of claim 17.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 9, 10, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 6,303,263 B1).

As discussed above in Paragraph 4, Chen teaches the use of 10 wt.% of his photoacid generator. It is the Examiner's position that the amount of 10 wt% taught by Chen is close enough to the lower end of present range of 11-15 wt% and to the lower end of present range of *at least about 12 wt%* that one skilled in the art would have expected them to have the same properties. Thus, the prior art's teaching of 10 wt% would render present ranges of claims 9, 10, 22 and 23 *prima facie* obvious. Where the claimed ranges and prior art do not overlap but are close enough that one skilled in the art would have expected them to have the same properties, a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Titanium Metals Corporation of America v. Banner, 227 USPQ 773 (Fed. Cir. 1985). Therefore, Chen's teaching would render obvious present inventions of claims 9, 10, 22 and 23.

8. Claims 1, 7, 8, 11-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barclay et al (6,492,086 B1).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject

matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2).

In Example 8 (see also, col.1, lines 6-11), Barclay teaches a chemically amplified positive-acting photoresist composition comprising phenol/styrene/2-methyladamantyl methacrylate terpolymer and di-t-butyl phenyl iodonium camphorsulfonate in the amount of *solid ratio of 4.72*. Barclay spin-coats the photoresist composition onto a silicon wafer and then expose it with a KrF laser. Barclay clearly states (col.13, lines 33-36) that his resists also will be useful for exposure with E-beam exposure, and **extreme UV exposure**. Based on this teaching, it would have been obvious to use extreme UV to expose Barclay's photoresist-coated silicon wafer in Example 8 with a reasonable expectation of obtaining a high-resolution relief image. The amount of solid ratio of 4.72 for the photoacid generator as taught by Barclay is close enough to the lower end of present range of *5 to 15 wt%* that one skilled in the art would have expected them to have the same properties. Thus, the prior art's teaching of solid ratio of 4.72 would

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render present range of claim 1 *prima facie* obvious. Where the claimed ranges and prior art do not overlap but are close enough that one skilled in the art would have expected them to have the same properties, a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Titanium Metals Corporation of America v. Banner, 227 USPQ 773 *Fed. Cir. 1985). For the same reason, the prior art's teaching of solid ratio of 4.72 would render present ranges of claims 7 and 8 *prima facie* obvious. Therefore, Barclay's teaching would render obvious present inventions of claims 1, 7, 8, 11, 13, 16-18 and 20.

With respect to present claims 12, 14, and 15, Barclay teaches (col.11, lines 29-50, col.12, lines 19-26) that as his photoacid generator, N-[(perfluorooctanesulfonyl)oxy]-5-norbornene-2,3-dicarboximide (a non-ionic compound) as well as iodonium compounds having anions of perfluorooctanesulfonate or perfluorobutanesulfonate can also be used. Therefore, Barclay's teaching would render obvious present inventions of claims 12, 14, and 15.

9. Claims 1, 7-18, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fedynyshyn (US 6,783,914 B1).

Fedynyshyn teaches (see claim 1) a positive photosensitive resist composition containing a resin binder and an encapsulated inorganic material. As the resin binder, Fedynyshyn teaches (see claim 4) a terpolymer of polyvinylphenol, t-butyl acrylate and styrene. Fedynyshyn also teaches the use of 0.5-20 wt.% of photoacid generator which examples include diphenyliodonium triflate as well as 2,6-nitrobenzylester compounds (see col.11, lines 63-67, col.12, lines 1-22). After applying a layer consisting of his

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positive photoresist to a substrate, Fedynyshyn exposes the coating with radiation and then develops the expose coating to remove the exposed areas (see col.17, lines 7-12). Fedynyshyn teaches (col.3, lines 15-20) that EUV can be used as the light source. The range of 0.5-20 wt.% for Fedynyshyn's photoacid generator overlaps with present ranges of claim 1, 7-10, 22 and 23. Therefore, the prior art's range would have made present ranges *prima facie* obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Therefore, Fedynyshyn's teaching renders obvious present inventions of claims 1, 7-18, 20, 22 and 23.

10. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (6,103,447).

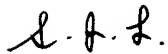
Chen teaches (col.1, lines 7-17, col.3, lines 3-12, lines 15-22) a positive tone chemically amplified resist system for use in mid-UV, deep-UV, **extreme UV**, X-ray, and e-beam lithography comprising (a) a polymer resin composition (a blend of at least two miscible aqueous base soluble polymer resins, one of which is partially protected with a high activation energy protecting group and the other of which is partially protected with a low activation energy protecting group), (b) acid generator, and (c) a solvent. As the polymer resin protected with a high activation energy protecting group, Chen teaches, for example in Example 5, a terpolymer of *hydroxystyrene*, *styrene*, and *tertiary butyl acrylate*. Chen teaches (col.7, lines 10-14) that his chemically amplified resist system preferably comprises from about 0.005 to about 10 wt% of the acid generator. Since 10

wt% is clearly disclosed in the reference as the higher limit of the range, one of ordinary skill in the art would immediately envisage using 10 *wt%* of the acid generator in Chen's chemically amplified resist system. The amount of 10 *wt%* taught by Jung is close enough to the lower end of present range of 11-15 *wt%* in claim 22 and to the lower end of present range of *at least about 12 wt%* in claim 23 that one skilled in the art would have expected them to have the same properties. Thus, the prior art's teaching of 10 *wt%* would render present ranges of claims 22 and 23 *prima facie* obvious. Where the claimed ranges and prior art do not overlap but are close enough that one skilled in the art would have expected them to have the same properties, a *prima facie* case of obviousness would exist which may be overcome by a showing of unexpected results, In re Titanium Metals Corporation of America v. Banner, 227 USPQ 773 (Fed. Cir. 1985). Although in Example 5, Chen exposes his resist film to DUV light, since Chen clearly states that his chemically amplified resist system is for use in mid-UV, deep-UV, **extreme UV**, X-ray, and e-beam lithography (and since there are only a few alternatives of light source listed), it would have been obvious to one of ordinary skill in the art to expose Chen's resist coated on the silicon wafer to extreme UV with a reasonable expectation of obtaining a pattern with high resolution. Therefore, Chen's teaching renders obvious present inventions of claims 22 and 23.

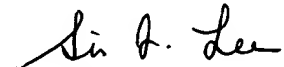
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Lee
December 24, 2005



SIN LEE
PRIMARY EXAMINER